

The Credit Valley Hospital – CLINICAL PRACTICE GUIDELINES

Folder Name: Clinical Practice Guidelines
Date of Issue: 8/10/2011
Issued By: Dr. Mathias Gysler, Chief of Medical Staff

Title: Transfusion of Blood and Blood Products in Adults CPG

PURPOSE:

To provide guidelines to be utilized when the transfusion of blood and/or blood products is being considered. Decision to transfuse remains the physician's judgement based on comprehensive assessment of the patient's clinical symptoms and risk factors.

SELECTION CRITERIA:

Exclusion Criteria

- Any patient who refuses to give consent for transfusion of blood and/or blood products
- In Emergency situations the Physician may carry out transfusion prior to obtaining consent in order to avoid any delay which may result in compromise to life, limb, and vital organ or prolong suffering if the Physician believes that the patient would, if able, consent to the treatment. This circumstance will be documented on the consent form by the physician and placed on the patient's health record.

RESPONSIBILITY:

Physician:

- Prior to the ordering of any blood or blood product, the patient will be informed of the material risks, benefits and available alternatives to transfusion, so that informed consent may be obtained as per the [\[Para-Link\] Consent to Treatment Policy and Procedure PP 3.1](#).
- The physician will document the indication for transfusion on the pre-printed order form [Physician Orders: Administration Blood and Blood Products \(#60002 D HR current version\)](#).

Transfusion Medicine:

- Transfusion medicine will release blood and blood products upon receiving a copy of the pre-printed order form [Physician Orders: Administration Blood and Blood Products \(#60002 D HR current version\)](#).
- Transfusion medicine will release uncrossmatched blood upon receiving the requisition titled **Requisition for Uncrossmatched Blood. (3588 D)**
- Transfusion medicine will review the indication(s) for transfusion on all requests for blood or blood products.

Exception: Transfusion medicine will give consideration to the above process when the administration of multiple/massive transfusion is required during an emergency situation.

ASSESSMENT AND TREATMENT AND/OR MONITORING:

TRANSFUSION OF RED BLOOD CELLS (RBCs)

A. Bleeding Surgical Patient

Red blood cell transfusion should not be dictated by a single hemoglobin “trigger” but instead should be based on the patient’s risks of developing complications from inadequate oxygenation. Red blood cell transfusion is rarely indicated when the hemoglobin is > 100 g/L and is almost always indicated when < 60 g/L. Hemoglobin of 80 g/L is thought by some to be the level when patients should be assessed as candidates for transfusion, as long as all factors that contribute to the patient’s oxygenation are considered. Patients may be transfused at a hemoglobin > 80 g/L, when there are signs of inadequate oxygen delivery including; tachycardia, hypotension, myocardial ischemia and hypoxemia.

- Hemoglobin < 80 g/L * – transfuse packed RBCs to maintain hemoglobin 80 g/L. Transfuse one unit and reassess.
- Hemoglobin ≥ 80 g/L with adequate oxygenation, transfusion should be avoided.
- Hemoglobin ≥ 80 g/L and patient shows signs of decreased oxygenation, transfuse to alleviate signs and symptoms. Transfuse one unit and reassess.

*High risk patients, maintain hemoglobin at 90 g/L.

High risk patients include:

- O₂ saturation < 90% for operating room only
- MI/CHF in last 6 months
- Angina < 2 blocks/ 1 flight of stairs
- Stenotic valvular disease
- Age > 75
- Prior stroke/TIA

B. Non-bleeding Surgical Patient

- Hemoglobin > 100 g/L is very low risk to patient. Transfusion should be avoided.
- Hemoglobin 80 – 100 g/L is low risk to patient. Avoid transfusion or transfuse 1 unit RBCs based on evaluation of the clinical situation i.e. volume status, pulmonary status, cardiac status, duration of anemia, dyspnea on exertion, estimated blood loss during surgery, extent of surgery and risk of rebleed. Reassess after each unit of RBC.
- Hemoglobin 60 – 80 g/L is moderate risk to patient. Try to avoid transfusion, increase O₂. Transfuse 1 unit RBCs based on evaluation of clinical situation. Reassess after each unit RBCs.
- Hemoglobin < 60 g/L is high risk to patient. Usually requires transfusion. Transfuse 1 unit RBCs. Reassess after each unit.

C. Obstetrical Patient

The potential risk for transfusion in obstetrics should be discussed with the patient during their antenatal care. The identification of antenatal risk factors, and education on intrapartum and postpartum risk factors should be reviewed with the patient during their antenatal visits. Although the incidence of transfusion in obstetrics is low the identification of risk factors will increase the likelihood of the transfusion of blood and/or blood products in obstetric patients.

The cardiovascular dynamics and physiological changes are entirely different in the obstetrical patient. Red blood cell transfusion should be considered in the following instances:

- Acute blood loss of any amount if there is clinical evidence of inadequate oxygen-carrying capacity or unstable vital signs
- Symptomatic anaemia regardless of hemoglobin level
- Hemoglobin < 70 g/L if not amenable to other timely therapies, antenatally, intrapartum, or immediately postpartum
- Patients receiving general anaesthetic if their pre-operative hemoglobin is < 70 g/L

For patients declining blood transfusion, careful prelabour assessment and planning should be carried out. Other treatment options in case of a post partum hemorrhage should be discussed with the patient.

D. Acute Medical Hemorrhage

Acute blood loss of up to 30% of circulating volume can often be treated with crystalloid alone. Failure of vital signs to stabilize after two crystalloid boluses warrants urgent transfusion. Reliance on hemoglobin alone is not valid in this setting. The signs and symptoms of adequate oxygenation are more critical in this situation. Treat patients similar to the acute bleed surgical patient.

E. Chronic Anemia Patient

Before considering transfusion of red blood cells for the treatment of chronic anemia, it is essential to determine the cause of the anemia so that, where appropriate, treatment other than red blood cells transfusion may be used.

- Treat anemia with specific pharmacologic agent (e.g. vitamin B₁₂, folic acid, erythropoietin, iron) when specific diagnosis indicates.
- Asymptomatic patients with a hemoglobin > 80 g/L – transfusion should be avoided.
- Symptomatic patients (regardless of hemoglobin) may be transfused to minimize symptoms and risks of anemia including tachycardia, dyspnea, light-headedness, decreased functional capacity, exercise intolerance, angina, headache and fatigue.

TRANSFUSION OF PLATELETS

The need for platelet transfusion is dependent on multiple risk factors. Transfusion of one platelet dose will increase the platelet count by approximately $15\text{-}30 \times 10^9/\text{L}$ in the average adult. The usual therapeutic dose for an adult is 1 pool of buffy coat derived platelets, or 1 single apheresis platelet unit. The possibility of hemorrhage and the need for platelet transfusion can be determined by the platelet count when combined with clinical observations and risk factors.

- Prophylactic platelet transfusion is ineffective and rarely indicated when thrombocytopenia is due to increased platelet destruction (i.e. ITP, HIT and TTP)
- Prophylactic platelet transfusion for surgical patients is usually indicated when the platelet count is $< 50 \times 10^9/\text{L}$ and is rarely indicated when the platelet count is $> 100 \times 10^9/\text{L}$. Requirement for platelets when the platelet count is $50 - 100 \times 10^9/\text{L}$ should be based on risk of bleeding.
- Prophylactic transfusion is indicated for platelet counts $< 10 \times 10^9/\text{L}$ not resulting from ITP. These patients are at risk of major spontaneous bleeding.
- Platelet transfusion may be indicated for platelet counts $> 50 \times 10^9/\text{L}$ in patients with a known platelet dysfunction and ongoing bleeding.
- Transfusion may be indicated when platelet counts are $> 50 \times 10^9/\text{L}$ and there is ongoing significant bleeding or if prior to invasive procedures.
- Transfusion is usually indicated in massive transfusion when more than 1 blood volume has been replaced.

TRANSFUSION OF FROZEN PLASMA

Frozen plasma transfusions should be considered when a patient is at risk of adverse effects from inadequate coagulation factors. Recommended dose is 10-15 mL/Kg

- Transfusion is indicated for the urgent reversal of Coumadin/Warfarin overdose when Prothrombin Complex Concentrate (PCC) Octaplex® is contraindicated or not available. Refer to *Warfarin Reversal – Acute Management in Adults Clinical Practice Guideline*
- Transfusion is indicated for the correction of known coagulation factor deficiencies when specific factor concentrates are not available
- Transfusion is indicated for the correction of bleeding when INR > 1.5 and PTT is 1x upper limit of normal.
- Transfusion is indicated for the correction of bleeding secondary to coagulation deficiency in patients transfused with > 1 blood volume. (Massive Transfusion)
- Transfusion of FP is contraindicated for use as a volume expander.

NOTE: Frozen plasma (FP) frozen within 24 hours of collection supersedes Fresh Frozen Plasma (FFP) frozen within 8 hours of collection. There is no clinically significant change in the factor VIII content of FP compared with FFP.

FFP and Cryosupernatant Frozen Plasma will be available for plasma exchange.

TRANSFUSION OF CRYOPRECIPITATE

Cryoprecipitate contains Factor VIII, fibrinogen, von Willebrand's factor and Factor XIII. Transfusion of cryoprecipitate is indicated when patients with these coagulation factor deficiencies are at increased risk of hemorrhagic complications.

- Cryoprecipitate is indicated for bleeding patients with von Willebrand's Disease if DDAVP or Humate P is not available or ineffective.
- Cryoprecipitate is indicated for correction of bleeding when the fibrinogen level is < 1.0 g/L. during massive transfusion or when patient has DIC
- In non-bleeding perioperative or peripartum patients with congenital fibrinogen deficiencies or von Willebrand's Disease unresponsive to DDAVP, decisions to prophylactically treat with cryoprecipitate should be made in consultation with the Hematologist.

REFERENCES

- American Society of Anesthesiologists Task Force. (1996). Practice Guidelines for blood component therapy. *Anesthesiology* , 732-747.
- Callum, J., & Pinkerton, P. (2003). *Bloody Easy 2, Blood Transfusions, Blood Alternatives & Transfusion Reactions, A Guide to Transfusion*. Toronto: Sunnybrook Health Sciences.
- Canadian Blood Services. (2006). *CBS: Clinical Guide to Transfusion* . Retrieved August 1, 2011, from Canadian Blood Services: <http://www.transfusionmedicine.ca/resources/clinical-guide-transfusion>
- Committee, P. P. (2009). *Provincial Plasma Audit Report*. Toronto: Ontario Blood Coordinating Network.
- Ekeroma, A., Ansari, S., & Stirrat, G. (1997). Blood Transfusion in Obstetrics and Gynaecology. *Br J Obstet Gynaecol* , 278-84.
- Expert Working Group. (1997). Guidelines for red blood cell and plasma transfusions for adults and children. *Can Med Assoc J* , 11 supp.
- Medical Progress: Transfusion Medicine (First of Two Parts) - Blood Conservation. (1999). *NEJM* , 525-533.
- Medical Progress: Transfusion Medicine (First of Two Parts) - Blood Transfusion. (1999). *NEJM* , 438-477.
- Practice Guideline Development Task Force Of College Of American Pathologists. (1994). Practice parameter for the use of fresh-frozen plasma, cryoprecipitate, and platelets. *JAMA* , 777-781.
- Practice Guideline Development Task Force of the College of American Pathologists. (1998). Practice parameter for the use of red blood cell transfusions. *Arch Pathol Lab Med* , 130-138.

EDUCATION:

The Transfusion Committee will be responsible for an education plan to ensure staff members directed by the information contained in the clinical practice guideline are notified. New staff will receive education through hospital and/or department orientation.

EVALUATION:

- Compliance with the use of the standard physician orders “Blood and Blood Products” will be monitored by the Transfusion Committee.
- Compliance with the guideline indications for transfusion will be monitored.
- Data collected from the Physician Order for Blood and Blood Products will be available for audit purposes by the Transfusion Committee.

DEVELOPED BY:

Medical Director Transfusion Medicine, Chair Transfusion Committee

APPROVED BY:

Medical Advisory Committee: Mar 2003/ June 2011

SUPERCEDES:

2008-03

CPG20-2 Transfusion of Blood & Blood Products in Adults